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**From:** Carter, James (IHS/PHX) [James.Carter2@ihs.gov]  
**Sent:** 7/25/2018 9:37:24 PM  
**To:** Rapicavoli, Emmanuelle [Rapicavoli.Emmanuelle@epa.gov]  
**CC:** brad.rea@ihs.gov  
**Subject:** FW: Latest HAMP Schematics for the 10% Meeting

Emmanuelle,  
Please see my answers in blue and Brad's in red.

I am sorry I did not get back sooner. I deferred on a few, but I will get you those soon.

Here is a quick update on the HAMP status. I am working on the project summary, MOA and schedule for the HAMP this week. IHS met with the Hopi Council yesterday and they have asked us to meet with the Hopi Council's Water & Energy Committee each month. Our local staff is also going to attend the Village CSA meetings each month to help the Tribe keep the public informed on the status of the project.

HUC would like to have a technical meeting in the next few weeks on the 10% design document. IHS could then present the final 10% product afterward to the Water & Energy Committee and the HUC.

Thanks,  
James

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**From:** Rea, Brad (IHS/PHX)  
**Sent:** Wednesday, July 25, 2018 1:51 PM  
**To:** Carter, James (IHS/PHX) <James.Carter2@ihs.gov>  
**Cc:** Matson, Eric (IHS/PHX) <Eric.Matson@ihs.gov>; Litofsky, Alexandra (IHS/PHX) <Alexandra.Litofsky@ihs.gov>; Yazzie, Lydell (IHS/PHX) <Lydell.Yazzie@ihs.gov>  
**Subject:** RE: Latest HAMP Schematics for the 10% Meeting

James,  
See comments below in RED.

*Brad*

Brad Rea, P.E.  
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**From:** Carter, James (IHS/PHX)  
**Sent:** Wednesday, July 25, 2018 11:46 AM  
**To:** Rea, Brad (IHS/PHX) <[Brad.Rea@ihs.gov](mailto:Brad.Rea@ihs.gov)>  
**Subject:** FW: Latest HAMP Schematics for the 10% Meeting

Brad,  
Could you please help me with some responses to Emmanuelle's question below highlighted in yellow?

Thanks,  
James

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**From:** Rapicavoli, Emmanuelle [<mailto:Rapicavoli.Emmanuelle@epa.gov>]

**Sent:** Friday, July 06, 2018 3:50 PM

**To:** Carter, James (IHS/PHX) <[James.Carter2@ihs.gov](mailto:James.Carter2@ihs.gov)>

**Subject:** RE: Latest HAMP Schematics for the 10% Meeting

Thank you!

On option B, there are two storage tanks that are collocated with existing FMCV and Lower Sipaulovi tanks. I'm wondering if it makes sense to consolidate these into single tanks instead of dual, co-located tanks. For FMCV, I know we already have the funding in U76 for the new 250k gallon tank. Would we be able to use that existing funding plus the HAMP funding to build a 630k gallon tank (instead of a 250k and 380k tank) ? See Brad's response below.

At Lower Sipaulovi, the existing 75k gallon tank is 50 years old. It's in decent but not great shape. I wonder if that new tank could be designed with enough storage to take the existing 75k gallon tank offline (i.e. 185k instead of 110k)? See Brad's response below.

I would say that at least 50% of our sanitary deficiencies identified during sanitary surveys are related to storage tanks. Since O+M is an issue, I am just looking to reduce potential vulnerabilities if at all possible. Yes, WST O&M is a recurring deficiency issue. Also, new WSTs can be designed to require less regular maintenance because of new technology with coating systems for steel and also due to structural techniques which can reduce or eliminate common areas of coating system failure. Those areas include uncoated interior steel which rapidly corrodes in areas such as lapped roof-sheeting without full-perimeter welds and also interior roof-knuckle joints which are commonly welded on the exterior only but not well coated on the interior after knuckle-joint welding has occurred (thus creating "hot" areas on the interior steel). Radius-knuckle tanks can eliminate lapped roof sheeting and angled interior steel joints while also reducing "difficult-to-properly-coat" interior structural roof members and center-columns (depending on WST diameter). Thus, new WSTs are superior from the O&M perspective. Having said that, there remains a big advantage to having parallel side-by-side tanks because maintenance will still be required eventually but can then be accomplished on one WST while continuing to utilize the other.

On the chlorination side, do you have locations yet for the treatment buildings? I see two HAMP sites and one village facility. I'm curious mainly to ensure that disinfection by-product formation doesn't become an issue over the long transmission main runs and that there is enough mixing in the storage tanks to ensure adequate disinfection. It is believed that the high quality of the Turquoise Trail wells will not promote the formation of DBPs because there should be almost no [TOC] in those water sources. It is also believed that disinfection should occur at the wells to protect the water (multi-barrier approach) as it flows through many miles of buried piping to the end-users. Realistically, CI-residual maintenance should not be problematic, at least until the water is boosted from Lower Sipaulovi up to Upper-Sipaulovi/Mishongnovi/Shungopavi. It is possible that re-chlorination may be desirable at that booster-station location, but that remains to be seen. The IHS currently prefers to deal with the re-chlorination issue when and if it is deemed to be necessary. Many Navajo (NTUA) systems distribute chlorinated water over much longer distances than the proposed HAMP transmission mains will and maintaining a CI residual on those groundwater sources is not known to be a problem. At the same time, we are not aware that DBP formation is an issue for the NTUA systems either. Again, that is a benefit of deep groundwater sourced wells with little to no [TOC]

I remember you stating that the pumping costs would be roughly equal between options A+B. Could you share the estimates with me? \$100/day with 2017 usage. I'm guessing the lower demand for the 40hp pump (option b) would counterbalance the higher flows for the 15hp pump (option a)? Yes. That is correct.

Also, I'm wondering if the BIA Keams canyon connection also includes the water demand for the high school? No Keams or High School demands were included, but the waterline could support their demands as well as Hopi's for at least 20 years. I have to look how long the well pumps selected could support BIA. And if second mesa day school could be easily served by the lower sipaulovi tank? I would need to add BIA 2<sup>nd</sup> Mesa school to the design analysis sheet for Lower Sipaulovi. Initially, I don't think it would be a problem. I will check how long the tank could support the system with BIA.

Thanks for entertaining these questions and nice work on the design. I do have time after our call on Monday with enforcement if some of these questions are easily answered.

Thanks

Emmanuelle

Emmanuelle Rapicavoli  
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**Please:** All data submittals to our office should be sent by email to [datamanager@epa.gov](mailto:datamanager@epa.gov) with a copy to me (or your project manager in the Drinking Water Office). Data reports are due no later than the 10<sup>th</sup> of the month following the month that you receive results, or the 10<sup>th</sup> of the month following the compliance period, whichever comes first. Please include the whole lab report and copy of the Chain of Custody. Label with PWS name and number; & source or distribution system location codes or names for data collection points.

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**From:** Carter, James (IHS/PHX) [<mailto:James.Carter2@ihs.gov>]  
**Sent:** Thursday, July 5, 2018 5:29 PM  
**To:** Rapicavoli, Emmanuelle <[Rapicavoli.Emmanuelle@epa.gov](mailto:Rapicavoli.Emmanuelle@epa.gov)>  
**Subject:** Latest HAMP Schematics for the 10% Meeting

Emmanuelle,  
Attached are the schematics for alternatives A & B. Also, attached are the estimates for each.

Thanks,  
James